IEEE Transactions on Cognitive and Developmental Systems

Special Issue on Neuromorphic Computing and Cognitive Systems

I. AIM AND SCOPE

In recent years neuromorphic computing has become an important emerging research area. There has been rapid progress in computational theory, learning algorithms, signal processing and circuit design and implementation, which have shown appealing computational advantages over conventional solutions. The low size, weight, and power of these hardware architectures shows great potential for embedded cognitive systems. Starting from emulating the computational principles and architecture found in neural systems, neuromorphic computing aims to integrate sensory coding, synaptic computing (e.g., STDP), learning and memory, and attempts to develop neuromorphic sensors and chips, and cognitive behaving systems such as robots. Neuromorphic hardware has provided a fundamentally different technique for data representation and learning, e.g., asynchronous events rather than regularly sampled frames of images. Various hardware systems leveraging on neural spikes based computing have been reported to achieve good performance with much lower power consumption. Therefore, neuromorphic computing can inform cognitive systems because the algorithms that run on this hardware must be neurobiologically inspired. A huge potential exists for applying this emerging computing framework to the next generation of cognitive systems and robotics, neuro-inspired sensors and processors, etc.

II. THEMES

This special issue aims to report state-of-the-art approaches and recent advances on (a) learning algorithms constrained by limits of biology and neuromorphic hardware (b) neuromorphic hardware for cognitive systems and (c) applications of neuromorphic architecture or hardware to cognitive robotics. Topics relevant to this special issue include, but are not limited to

- Neuromorphic cognitive systems
- Cognitive robotics
- Brain-inspired data representation models
- STDP, Spike-based sensing and learning algorithms
- Spike-based processing and methods for configuring spike-based processors

III. SUBMISSION

Manuscripts should be prepared according to the "Information for Authors" of the journal found at http://cis.ieee.org/publications.html and submissions should be done through the IEEE TCDS Manuscript center: https://mc.manuscriptcentral.com/tcds-ieee and please select the category "SI: Neuromorphic Computing".

IV. IMPORTANT DATES

15 June 2016 – Deadline for manuscript submission

15 Sep 2016 – Notification of authors

15 Oct 2016– Deadline for revised manuscripts

15 Nov 2016 – Final version

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